



Concurrency in C# Cookbook: Asynchronous, Parallel, and Multithreaded Programming

By Stephen Cleary

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If you're one of the many developers uncertain about concurrent and multithreaded development, this practical cookbook will change your mind. With more than 75 code-rich recipes, author Stephen Cleary demonstrates parallel processing and asynchronous programming techniques, using libraries and language features in .NET 4.5 and C# 5.0.

Concurrency is becoming more common in responsive and scalable application development, but it's been extremely difficult to code. The detailed solutions in this cookbook show you how modern tools raise the level of abstraction, making concurrency much easier than before. Complete with ready-to-use code and discussions about how and why the solution works, you get recipes for using:

- *async* and *await* for asynchronous operations
- Parallel programming with the Task Parallel Library
- The TPL Dataflow library for creating dataflow pipelines
- Capabilities that Reactive Extensions build on top of LINQ
- Unit testing with concurrent code
- Interop scenarios for combining concurrent approaches
- Immutable, threadsafe, and producer/consumer collections
- Cancellation support in your concurrent code
- Asynchronous-friendly Object-Oriented Programming
- Thread synchronization for accessing data

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Editorial Review

Review

"Stephen Cleary has established himself as a key expert on asynchrony and parallelism in C#. This book clearly and concisely conveys the most important points and principles developers need to understand to get started and be successful with these technologies." - Stephen Toub, Principal Architect, Microsoft

"The breadth of techniques covered and the cookbook format make this the ideal reference book for modern .NET concurrency." -Jon Skeet, Senior Software Engineer, Google

"The next big thing in computing is making massive parallelism accessible to mere mortals. Developers have more power than ever before, but expressing concurrency is still a challenge for many. Stephen turns his attention to this problem, helping us all better understand concurrency, threading, reactive programming models, parallelism, and much more in an easy-to-read but complete reference." -Scott Hanselman, Principal Program Manager, ASP.NET and Azure Web Tools, Microsoft

From the Author

I had one major goal in writing this book: to cover **modern** approaches to concurrency. There are a hundred books out there that describe threads and all the various synchronization primitives in excruciating detail; this is not one of those. This book focuses specifically on how code *should* be written, not how code *could* be written.

This book does contain an introduction to concurrency (multithreading, asynchronous programming, etc). However, it is not an introduction to C# or .NET. I do expect my readers to understand delegates, lambda expressions, LINQ, OOP, etc. If you need help in these areas, there are other great books that cover these topics far better than I could do.

By focusing only on modern coding practices, and by avoiding "fluff", I've kept the book short. It's under 200 pages, a portable size. The vast majority of these pages are recipes written with an extremely practical mindset, so they can be used as a ready reference for the modern developer.

From the Back Cover

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Debbie Jones:

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Clarice Stephens:

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